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Optimizing Greenhouse Corn Production: How can Two-Spotted Spider Mites be Controlled?

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Purdue Methods:
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Greenhouse-grown corn is subject to many insect pests, including aphids, thrips and mites. Of these, the most challenging to control in our facility is Two-spotted Spider Mite, *Tetranychus urticae*, due to its ability to develop resistance to miticides. Mites thrive in the warm temperatures required for corn growth. Also, they are easily spread by people moving through the tall rows of plants. The automated watering of our proposed system reduces the human traffic, possibly reducing mite spread. But other control measures are always required.

We grew a crop of corn during the summer season, when spider mites are most prevalent, using a successful combination of cultural and biological control. Mite control was excellent, while other areas of the facility not treated this way were infested. Plants were sprayed off three times per week with clear water using a brass nozzle (see Figure 3). The stream of water was turned upward to wash underside of all leaves. This started at V4 leaf stage and carried on through ear fill. Note that care must be taken during pollen shed not to get tassels wet, otherwise pollen shed will be delayed (Nielsen, 2001). The procedure took 2-4 minutes for 120 plants, depending on age of the crop. It can be challenging in tight rows.

At first sign of spider mites, 3 weeks after emergence, the two lowest leaves were removed from all the plants (see Figure 4). We've observed that spider mite infestations typically start at lowest leaves. The following week, about 4 weeks from emergence, 1500 beneficial mites, *Phytoseiulus persimilis*, were applied evenly to the crop (see Figure 5). We did not monitor the population of this species, and they may have been washed off with our clear water sprays.

Subsequently, we have effectively controlled Two-spotted Spider Mite on our greenhouse corn crops with a combination of emptying and cleaning the greenhouse room between crops, lower leaf removal, clear water sprays and applications of *Phytoseiulus persimilis* at first sign of infestation. In two croppings, we did not apply the clear water sprays but were forced to use more beneficial mites. We believe the rate of *P. persimilis* application for tall corn should be double the highest rate suggested by suppliers, as high as 100 mites per square meter, and may require more than one application. If needed, we also apply a miticides that are compatible with the beneficial mites. Consult your supplier for compatibility information.

This document is based on materials originally posted to the Purdue University HLA Department Plant Growth Facility web site: http://www.hort.purdue.edu/hort/facilities/greenhouse/CornMethod.shtml

Figure 1. Left: First sign of spider mite speckling damage of corn leaves. Right, fully infested leaves.

Figure 2. Spider mites visible on webbing at tassel.

Figure 3. Left: Brass nozzle for washing plants of mites. Right: Lowest 2 leaves removed.

Figure 5. Beneficial mite *P. persimilis* is in vermiculite carrier seen on this leaf.